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THE NEWSPAPER FOR
THE HOBBYIST OF VINTAGE
ELECTRONICS AND SOUND

THE HORN SPEAKER

The "Neutrodyne" Receiving System

Outlining the Hazeltine Method of Securing Radio Frequency Amplification Without Regeneration or Reradiation

By KIMBALL H. STARK

Chief Engineer, F. A. D. Andrea, Inc.

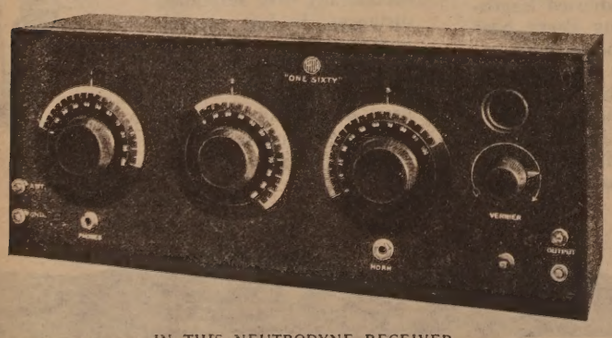
RADIO enthusiasts speak freely of audions, pliotrons, dynatrons, super-regeneration and heterodyne; but now comes a new word—"neutrodyne."

Neutrodyne is the coined name for a revolutionary radio receiver circuit that seemingly achieves the impossible. It neutralizes the capacity coupling of the circuits and allows very efficient radio-frequency amplification even on short wavelengths. In effect, the usual regeneration of the circuit is eliminated by this method of neutralizing the coupling capacities.

On the evening of March 2nd, 1923, Professor L. A. Hazeltine, Professor of Electrical Engineering at Stevens Institute of Technology, Hoboken, N. J., delivered a lecture before a meeting of the Radio Club of America, telling in detail of his work which, extending over a number of years, has resulted in the development of the neutrodyne circuit. The application of this circuit to the problem of radio-frequency amplification is only one of the uses of the neutrodyne principle as developed by Professor Hazeltine.

Briefly reviewing the methods of producing amplification in radio receiver circuits, we find that radio-frequency amplification can be obtained by using three possible methods of coupling one circuit to another, namely, resistance coupling, impedance coupling and transformer coupling. Resistance coupling is possibly desirable when wavelengths above 1,000 meters can be used, but the amplification per stage is not great and the tuning is broad. Impedance-coupled amplifiers when tuned are much more efficient and good results have been obtained from their use. If two or more stages of tuned impedance amplification are employed, however, the sharpness of tuning means very difficult adjustments and as a result cascade amplifiers of this type are not in general use. On the other hand, transformer coupling of amplifier circuits, because it has been standard practice with audio frequency circuits, has always found favor with both professional radio engineers and amateur experimenters as the ideal method of obtaining efficient radio-frequency amplification.

To date, two general devices for transformer-coupled radio-frequency amplifying circuits have been used; those employing air-core transformers and those having iron-core transformers. Circuits using air-cored transformers are extremely sharp in their tuning and the wavelength range of the transformers is necessarily limited. In cascade amplifiers of this type a multiplicity of controls is thus necessary, and very accurate tuning is required for each stage to get good results on the various wavelengths. For some time iron-cored transformers for radio frequency work were thought to be impracticable, due to the enormous eddy-current and hysteresis losses developed in the cores at these high frequencies. Later work with iron-cored transformers showed that by using cores made of special, very thin laminations and taking great care in the design and assembly of the transformer, quite satisfactory amplification could be obtained.



IN THIS NEUTRODYNE RECEIVER

All the tuning is done with the three dials. In a test made by RADIO BROADCAST, broadcasting stations over a thousand miles distant were heard on a loud speaker at night

Special means were devised to broaden the wavelength band, but even as with air-cored transformers, it was impossible to utilize windings with a step-up ratio. Thus several stages were needed to obtain long distance signals.

As nearly every experimenter will agree, it is exceedingly difficult to hook up, even in the laboratory, either of these types of radio-frequency amplifier circuits and not get oneself into all sorts of trouble. At high frequencies the losses in the insulating materials used, the necessity for making all soldered connections of low resistance, and the very great drawback of the impossibility of eliminating the capacity coupling between the circuit and its various parts, make the problem seem impossible of solution. The matter of capacity coupling is obviously the most important. The capacity of the output circuit to the input circuit between the wiring of the set provides a path for a feed back of energy with the result that the apparatus oscillates. In broadcast reception using this sort of equipment the incoming signals are likely to be distorted, the overtones and undertones being eliminated, and the tuning accompanied by whistles as each carrier wave is crossed. In addition to the capacity coupling between the circuits the inductive coupling of transformers, inductances, etc., is also likely to bring this reaction about.

THE THEORY OF THE NEUTRODYNE

PROFESSOR Hazeltine in his lecture pointed out methods of overcoming, through neutralization, these various capacities between component parts of receiver and amplifier circuits. Theoretically his method may be explained as shown graphically in Fig. 1. We have two circuits, A and B, coupled to each other by a metallic connection C and, in addition, by the coupling capacity D. A magnetomotive force is set up in circuit B because of energy being transferred by the capacity coupling, a voltage and current transfer taking place. This condition in many instances is undesirable and decreases the efficiency of the receiver or amplifier circuit.

To make clear his method of neutralizing this capacity coupling between circuits, Professor Hazeltine explains by the drawing the use

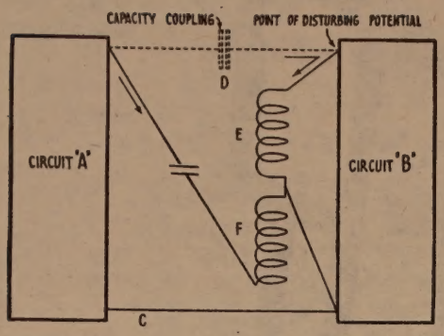


FIG. 1
A theoretical presentation of Prof. Hazeltine's neutralizing scheme

of an inductance tapped in the centre as shown. To the point of the disturbing potential on the circuit B one end of this inductance is connected and the other end is connected to a similar point on circuit A through an adjustable neutralizing capacity. The centre tap of this inductance system is connected to the low potential point of the circuit B. In effect, the path of the voltage and current is as shown by the arrows, with the energy caused by the parasitic capacity coupling D passing down through coil E in one direction and with the current and voltage in the opposite direction through branch F, going into the inductance system as an opposing voltage, thus inductively neutralizing the coupling capacity effect and causing no voltage across the terminals of circuit B.

As applied to radio circuits the drawing of Fig. 2 shows the device adapted to neutralizing the grid-to-plate capacity of vacuum tubes. In this circuit coils E and F are placed respectively in the grid and plate circuits while the centre tap goes to the common filament connection. The grid-plate capacity is shown by dotted lines and the neutralizing capacity is adjusted to offset the grid-plate capacity coupling. It is possible that the inductances E and F might be replaced by the inductances of other units as used in the circuit, as for instance the primary and secondary coils of an air-core radio frequency transformer. Professor Hazeltine showed that the character of these transformers affects the size of the balancing-out neutralizing capacity and that in his system it is possible to utilize transformers with a step-up ratio in the order of one to four and thus reduce the capacity of the neutralizing condenser to approximately one or two micro-microfarads.

In both of these explanatory drawings the capacity to be neutralized out or eliminated has been represented by dotted lines as being only a single capacity. In practice this capacity may be made up of a great number of small capacities whose total is balanced out by the neutralizing capacity.

Accompanying illustrations show interior and exterior views of a receiver built by F.

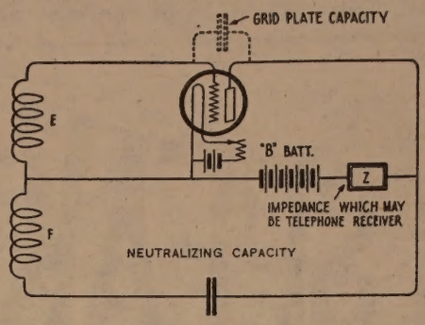


FIG. 2
Applying the neutralizing method to a vacuum tube circuit

A. D. Andrea, Inc., employing the Hazeltine principle in its commercial form. It will be noted that but four controls are used, three of them being tuning controls and the other being the detector tube vernier rheostat. Two stages of tuned radio-frequency amplification, a vacuum-tube detector, and two stages of audio-frequency transformer-coupled amplification is obtained, using only four tubes. One tube does double duty as both audio- and radio-frequency amplifier.

In the interior view the amplifying transformers are shown in the foreground. Three variable air condensers are mounted directly behind them and the transformers assume an angle with respect to each other such that no electro-magnetic coupling exists between them. The variable condensers shown in the wiring diagram in Fig. 4 are placed in parallel with the radio-frequency transformer secondaries, forming closed oscillatory circuits, so that dial settings for these condensers remain practically alike for any given wavelength. The settings of dial one, which is across the secondary of the transformer whose primary is in the open oscillatory antenna circuit, will vary in setting with various sizes of antennas used. With the average antenna, however, it should not vary more than 10° to 12° above or below the settings of dials two and three counting from the left.

The important neutralizing condensers are pictured just above and between the variable condensers and transformer units. It is rather difficult to imagine a variable condenser having so small a capacity as 1 micro-microfarad and with the added advantage of having no connection to its moveable element. Such a condenser can be readily constructed. As shown in the drawing in Fig. 3 it consists of an insulated sleeve in which are inserted two pieces of wire with about $\frac{1}{8}$ inch space between them at the center. A metal tube is adjusted lengthwise outside of the insulating sleeve over the ends of the two wires. The resulting capacity is the series capacity of the metal tube to both wires. After this capacity is adjusted during the testing of the receiver it is sealed, being adjusted carefully for the particular types of vacuum tubes used. The adjustment of these neutralizing capacities is made experimentally by tuning in a strong signal, then turning out the filament of the tube whose capacity is to be matched but leaving the tube in its socket. If the neutralizing capacity is not correct the circuits on each side of the tube will have capacity coupling which will transmit the signals into the receivers. The neutralizing capacity is then adjusted until the signal disappears, then sealed in place. Such a method illustrates that the neutrodyne circuit operates to eliminate the capacity coupling and is not just a method for opposing the effects of regeneration, because the adjustment is made while the filament is cold and therefore under conditions when the tube could not regenerate.

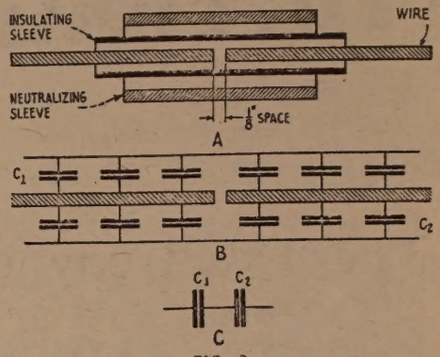


FIG. 3
The arrangement shown in A forms a condenser shown in B. The resultant capacity is the series capacity of the two rods to the neutralizing sleeve

With one of these receivers utilizing the neutrodyne circuit and only four vacuum tubes, three of the stations copied from New York City are noted below, together with the dial settings. In this work an indoor antenna was used consisting of about 50 ft. of annunciator wire running along the picture molding.

A glance at the dial setting indicates the sharpness with which tuning may be accomplished.

		Dial 1	Dial 2	Dial 3
KYW	Chicago, Ill.	35	66	66.5
WOO	Philadelphia, Pa.	35.5	67	65
WGM	Atlanta, Ga.	46	74	71.5

Another advantage of the neutrodyne capacity neutralizing circuit is the fact that it can be used with circuits employing regeneration if desired. This means that amateur C. W. reception can be carried out successfully over very long distances; in fact, several tests made in New York City by amateurs not particularly familiar with the circuit have resulted in reception from every district in the country, stations from the

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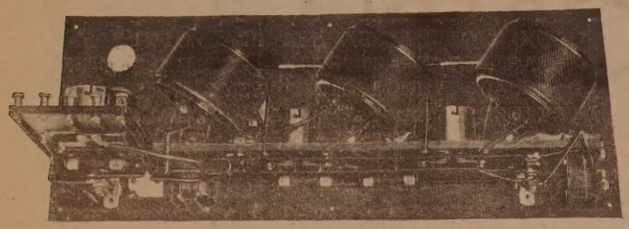
THE INTERIOR OF THE RECEIVER

Is well planned. Note the angle at which the transformers are mounted to cut out electro-magnetic coupling. The brass sleeves which form the neutralizing condensers may be seen between the transformers



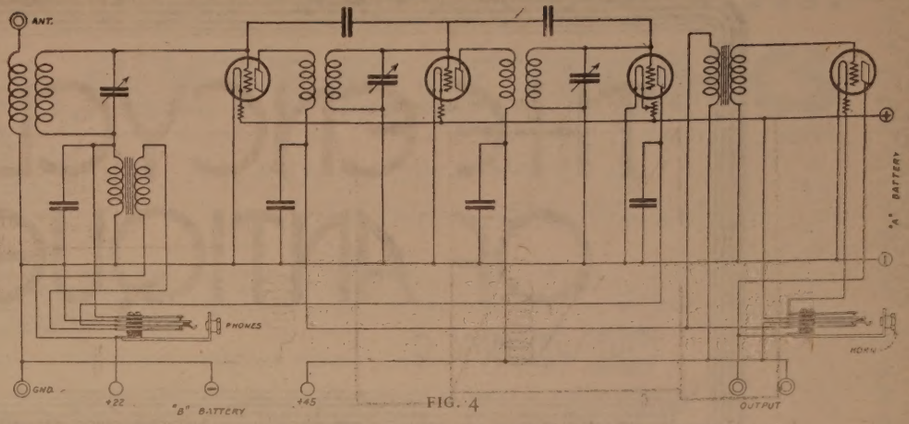


FIG. 4

THE NEUTRODYNE SYSTEM APPLIED TO A RECEIVER FOR GENERAL USE

In which there are three air-core transformers with tuned secondaries. The left hand one functions in the antenna circuit while the other two are used for the tuned R. F. inter-stage coupling transformers

West Coast coming in clearly and with good volume.

From a non-interference point of view the neutrodyne circuit possesses great advantages because it does not re-radiate even when used in connection with regenerative circuits, because it does not allow energy to be fed back into the antenna—in other words, oscillation, if it occurs at all, is confined to the detector circuit.

The selectivity of the receiver is great and yet because no regeneration occurs it is possible for even the novice broadcast listener to adjust the three dials quickly and receive concerts with great clarity. Dial settings for various stations read like football signals, and to be able to have the women folks turn the dials to prearranged settings, throw in the filament switch and pull in broadcasting stations 1500 miles away, is a feat that even some of the older radio "night-hawks" en-

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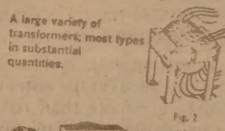

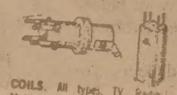

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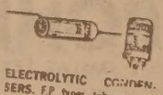

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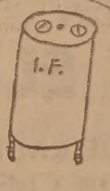

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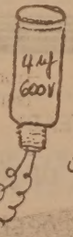

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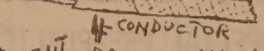

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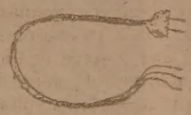

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CLINIC

A SECOND CHANCE FOR WORN OUT TUBES

BY RON BOOCHER

DON'T THROW AWAY THAT WORN OUT 201A! THERE MAY BE A WAY TO REVIVE IT, AND SAVE YOURSELF SOME MONEY; NOT TO MENTION THE FACT THAT YOU'LL BE HELPING PRESERVE THE PRECIOUS FEW OLD TUBES THAT ARE STILL AROUND.

THE PROCESS IS CALLED "REJUVENATION", AND IT INVOLVES TAKING A FILEMENT/CATHODE THAT IS NO LONGER A VERY GOOD EMITTER OF ELECTRONS, & BURNING OFF THE OUTSIDE SURFACE SO THAT A NEW EMITTING SURFACE IS EXPOSED. FILAMENTS WERE EITHER COATED OR IMPREGNATED WITH VARIOUS MATERIALS TO MAKE THEM GOOD ELECTRON EMITTERS. MOST OF THE OLDER TUBES SUCH AS THE UX-201A, HAD A FILAMENT MADE OF TUNGSTEN, IMPREGNATED WITH THORIUM OXIDE. IF YOU CAN BRING THE OXIDE OF A WORN OUT TUBE BACK TO THE SURFACE, IT IS REJUVINATED. TUBES THAT CAME LATER HAD ONLY A COATING OF OXIDE; AND ONCE THAT COATING WAS GONE THAT WAS IT,

REJUVENATION IS DONE BY PUTTING A MUCH HIGHER THAN USUAL VOLTAGE ON THE FILAMENT FOR A SHORT PERIOD OF TIME (FLASHING), THEN PUTTING A MUCH LOWER VOLTAGE (STILL HIGHER THAN NORMAL) FOR A MUCH LONGER TIME (AGEING). ALL THIS BEING DONE WITH NO VOLTAGE ON THE PLATE OR GRID.

THIS ALL SOUNDS SIMPLE ENOUGH, & WHEN I RAN ACCROSS A CHART IN GHIRARI'S "RADIO PHYSICS" (1931), THAT SHOWED WHICH TUBES COULD BE REJUVENATED, & HOW MUCH VOLTAGE TO USE, I DECIDED TO TRY IT. THE FACT THAT I WAS FACING HAVING TO BUY A SET OF 201A's FOR MY

LATEST ACQUISITION PROBABLY HAD A GREAT DEAL TO DO WITH MY DECIDING TO TRY IT.

I HAVE A TUBE TESTER ON WHICH YOU CAN SET THE FILAMENT VOLTAGES FOR WHATEVER TUBES YOU ARE TESTING. AS YOU CAN SEE FROM THE CHART BELOW, THE PROCESS FOR A UX-201A TUBE CALLS FOR 16 VOLTS FOR 10-15 SECONDS, THEN 7 VOLTS FOR 30 MINUTES. THE CLOSEST FILAMENT VOLTAGES TO THIS ON MY TESTER ARE 14 VOLTS AND 7½ VOLTS.

I DECIDED TO USE 14 VOLTS FOR 10 SECONDS AND 7½ VOLTS FOR 30 MINUTES.

FIRST I TESTED THE TUBE (CATHODE CONDUCTANCE), AND THE READING WAS 20 ON A SCALE OF 1-100. ON THIS TESTER, 50 IS THE DIVISION BETWEEN "GOOD" and "REPLACE", AND 60 IS ABOUT THE HIGHEST READING I EVER GOT ON A NEW TUBE.

WHAT A FEELING IT WAS, AFTER I THREW THE SWITCH, TO SEE MY PRECIOUS 201A LIGHT UP HALF THE ROOM. AFTER FINISHING THE PROCESS I TESTED THE TUBE AGAIN & GOT A READING OF 76. NEEDLESS TO SAY I WENT AHEAD AND REJUVENATED THE REST OF MY WORN OUT UX 201A'S, 201'S & 200'S.

I HAD ONE UV-201A (BRASS BASE). IT TESTED TO 15 BEFORE THE PROCESS, & STILL MEASURED 15 AFTER DOING THE PROCESS TWICE APPARENTLY THIS TYPE EITHER HAS A DIFFERENT TYPE FILEMENT OR IT WAS JUST TOO FAR GONE.

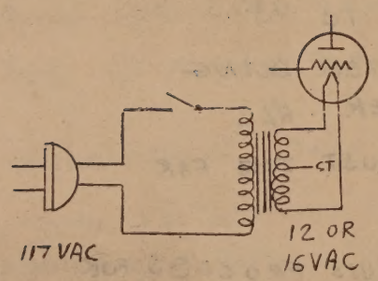
YOU DON'T NEED A TUBE TESTER TO DO THIS PROCESS, FOR EXAMPLE AN INEXPENSIVE 12 VOLT CENTER TAPPED TRANSFORMER COULD BE USED TO SUPPLY 12 VOLTS AC FOR THE FLASHING AND 6VAC FOR AGEING. WITH A LITTLE BIT OF CARE YOU SHOULD HAVE NO PROBLEMS. JUST FOLLOW THE CHART & KEEP IN

MIND THAT THESE ARE THE ONLY TYPES THAT ARE LISTED AS BEING CANDIDATES FOR REJUVENATION. I KNOW OF MANY PEOPLE WHO COULD BE CANDIDATES FOR REJUVENATION, BUT THEY ON THE LIST EITHER.

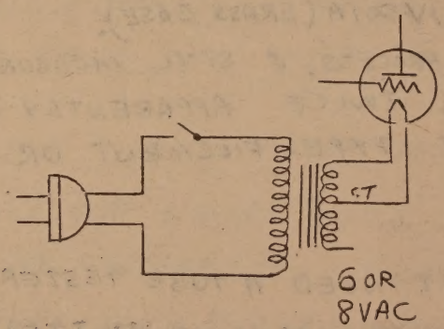
TUBE TYPE	FLASHING VOLTS	FLASHING DURATION	AGEING VOLTS	AGEING DURATION
UX-200	16	10-15 SEC.	7	30 MIN.
UX-200A	16	10-15 SEC.	7	30 MIN.
UX-201	16	10-15 SEC.	7	30 MIN.
UX-201A	16	10-15 SEC.	7	30 MIN.
UX-199	12	10-15 SEC	4	30 MIN.
UX-120	12	10-15 SEC.	4	30 MIN.
UX 240	16	10-15 SEC	7	30 MIN
UX 210	NO	FLASHING	9	30 MIN
UX-216	NO	FLASHING	9	30 MIN

THIS DATA APPLIES ALSO TO OTHER THAN RCA MANUFACTURED (UX) TUBES, SUCH AS THE CUNNINGHAM CX301A ETC,

CONNECTIONS FOR REJUVENATION



FLASHING



AGEING

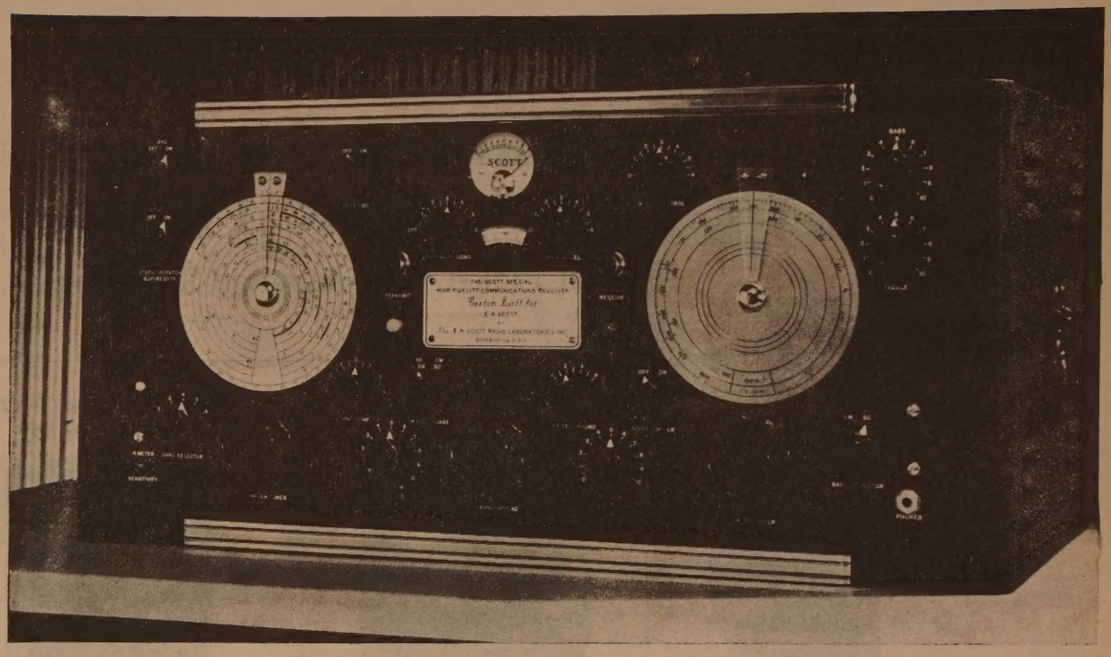
MY MAIN SOURCE OF INFORMATION WAS GHIRARDI'S RADIO PHYSICS (1931)

RON BOUCHER
376 CILLEY RD.
MANCHESTER, NH 03103

Zenith Stratosphere
Radio #2501 PC

18 or 25 tube

Wanted To Buy



The Dual Tuning Chassis of the Special High Fidelity Communications Receiver

The Scott Communication Receiver

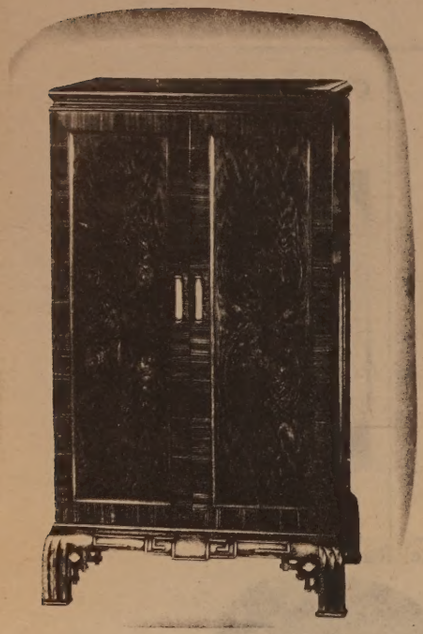
WILL PAY UP TO $2,000

NEED NOT WORK BUT MUST BE ORIGINAL
AND COMPLETE

SCOTT

ROGER REES
P. O. Box 4154
Rockford, IL 61110

(81) 964-8199



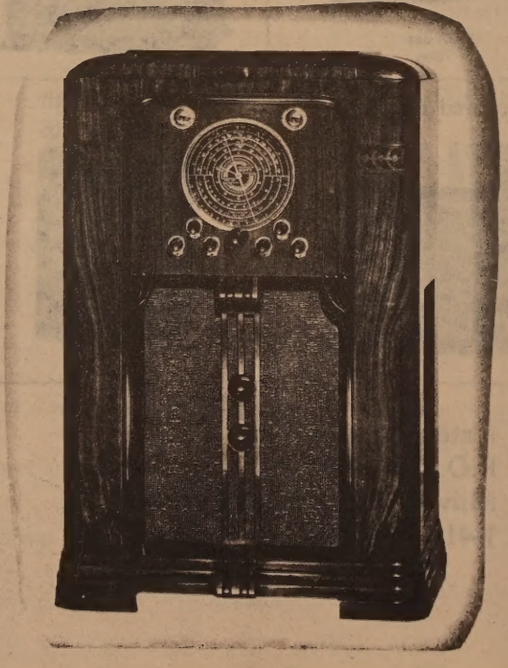
The Roslyn Grande

up to $400

up to $400

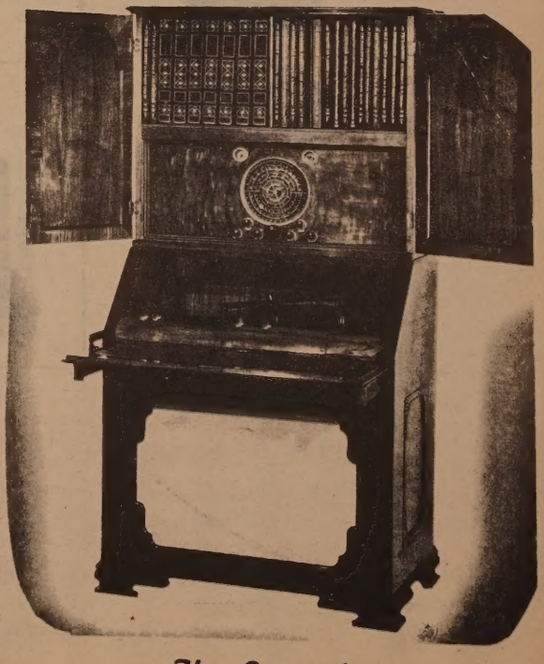
The Gothic Grande

up to $600



The Warrington

up to $500



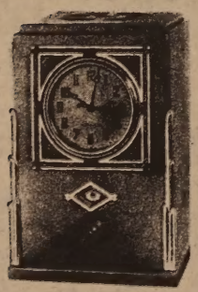
The Secretaire

Wanted To Buy

Cash - Paid **AC RADIOS 1 or 100** **Cash - Paid**

Will Pick-Up or Arrange Shipping

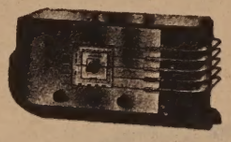
Radio - Clocks



Mirror - Radios

Sparton 1936 Line

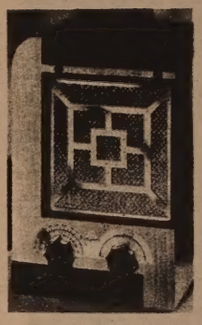
Gilfillan "Glass" Radio



Model 557
5 Tubes

Zenith Stratosphere Radio #2501 PC

Chrome & Wood Radios



Majestic Model 49

Cathedral or Mantel Radios

Colored Radios

Large Zenith Table Radios

Dual-Tuner Radios

Nate Alexander, Jr.
P.O. Box 866
Milwaukee, Wisconsin 53201
1-414-276-6773

FIND

Don't really know why I offered the past issues of Speaker for sale! At age 66 I sometimes feel, " why all this collection" get rid of it but then I realize how valuable a reference it is.

We're in the process of obtaining an old Hallicrafter Sky Buddy. Finally realized that my old time ham radio collection was missing something. I did a booth this past July at our National Convention here (under the AWA Banner!) and several old timers brought to my attention that I didn't have any old Hallicrafters---

Say, I read these little stories in your paper about those fortunate few who luck up on an old box of goodies, an old radio grandpa had etc! Well, I had my stroke of good luck recently! Just purely by chance I stopped in a new (????) place dedicated to the art of junk stuff and almost knocked a rather nice AK-35 off a box! It had five good Radio [illegible] tubes in it. Both audio [illegible] the back cable! In my excitement I ran into the [illegible] and talked to the fellow about it! "I've just brought in a van of junk from an attic in Boston. Would you want to look at an old box of radio junk?"

To make a long story short, I got the AK for $8.00 and the box for $10.00. The box contained 86 pieces (by actual count!) of 1920-25 vintage radio gear! Brass based, tit-topped 201a and WD-12 tubes, some good UV199, B/t 3 circuit tuner (mint, mint Amrad Vario-coupler, back page of Oct. 1923 QST), a Carborundum Det. Cartridge, sockets, audios, telegraph signaling unit with lite and buzzer, old Murdock condensers, Honeycomb coils et/al!! I'm still wiping the dust off the old pieces....So, those stories are true, believe me.

Not too much collecting and/or interest in this area. Have one [illegible] old timer [illegible] pieces. My collection is very small, but I enjoy showing and telling about the old daze!

Keep up the good work.

Wes. Chatellier
1950 Chevelle Dr.
Baton Rouge LA 70806

P.S. the thing on the 'loose coupler' is exciting!

letters

Dear Jim,

The ad worked nicely.

We have been very busy selling, but finding things are getting pretty rough.

We have a collectors group in N.Y. now. Our next meeting is March 6, at The Port Washington Library at 8 p.m. Please pass along the information to any in this area who are interested.

I've enclosed our last newsletter and a xerox of an article that was about my shop.

Looking forward to your next issue of "The Horn Speaker."

Charlotte Mager
WAVES
32 East 13th St.
New York NY 10003

Dear Jim:

We here at the Vintage Radio Shop certainly look forward to the issues of the Horn Speaker when they come out. Much, very interesting material can be obtained from this fine magazine, and some of the information provided certainly is worth more than any radio!

I enjoy reading the adds myself and sometimes have a good laugh when I see some of the advertisements of radios for sale for $200.00 to $300. some of which I've sold here in Rockford for $50.00 to $75.00 [illegible] restored and table models yet!

I just hate to see other collectors taken advantage of, by those who are out to get the most. True, there are those radios that are worth $300.00, $500.00, yes even $1000.00, but not every other one that comes through the door that looks interesting! Well. We keep trying to treat people fair, and wish others would do the same.

Here's my subscription renewal check. Keep up the fine magazine.

Sincerely,
Scott A. Webster
Vintage Radio Shop
1119 8th St.
Rockford IL 61104

Dear Mr. Cranshaw:

First, I would like to thank you for publishing "The Horn Speaker." It's a great publication, and although I've only been a subscriber for a very short time, I'm thoroughly pleased with it. Keep up the good work!

I have seen several references made to an article about Edwin H. Armstrong, which was in one of the issues published before I became a subscriber. Would you please send me a copy of that issue, if it is still available? Payment is enclosed.

Major Armstrong's life and work are of particular interest to me. I've done some research of my own, in addition to having made "pilgrimages" to his Yonkers home and his transmitting tower in Alpine, New Jersey. I would like to see his Alpine tower become a National Historic Site in recognition of his work--recognition which he was unfortunately denied during his lifetime.

Thank you.

Yours sincerely,
David W. Terwilliger
P.O. Box 651
White Plains NY 10602

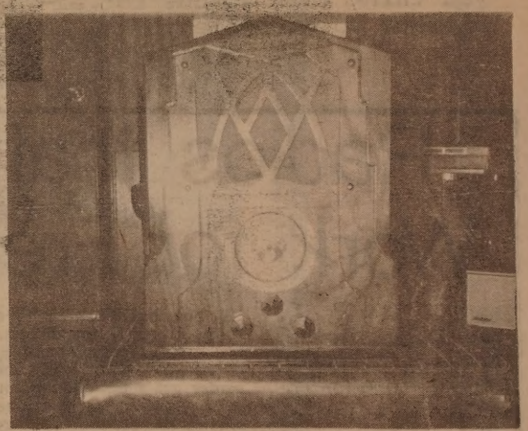
Dear Jim,

Now that I'm active in collecting and providing servicing info., I'll need my own subscription to the Horn Speaker. Enclosed is payment.

You may have heard that my dad, Morris Beitman, passed away a short while ago. I've got my own business, Antique Radio Services, and will continue to help collectors, as my dad did with Supreme Publications.

I really enjoy the Horn Speaker and look forward to the coming issues.

Hart Beitman
646 Kenilworth Terrace
Kenilworth IL 60043



Dear Jim,

I have just acquired a radio with no identification of any kind on it. I am enclosing a photo of it. Perhaps you, or one of the readers, could identify it for me.

It has 5 tubes. One 80, 6C6, 6C5 Also has a map of the world on the dial.

Also have just acquired a W. C. Grunow console model 1191. Can't seem to find it in any of my books. Plenty of Grigsby Grunow, but no just plain Grunow. What year is it?

Respectfully,
George Friedrich
Route 1, Box 85
Custer, Wis. 54423

ADVERTISE IN THE HORN SPEAKER

club news

'**********
'******COLLECTORS ABOARD******
'**********

' Our summer meet will be held 'aboard a Naval Destroyer at the 'Naval Park, Buffalo, New York 'on August 16, 1980. We have in- 'vited The Antique Wireless Asso- 'iation to join us. The subject 'is Crosley. We will have nat- 'ionally known speakers and the 'equipment contest is also on 'Crosley. Some of our clUB 'members specialize in Crosley 'so there will be some nice 'Crosley goodies on display. 'The flea market will precede 'the main meet (on land) in the 'parking lot.

' We are trying to work out a 'sponsored (free) cocktail party 'after the meet and before the 'dinner. It would be in the lob- 'by of a bank in the downtown 'Buffalo Mall. There would be 'a nice display of antique radios 'owned by our club members. If 'you think this sounds too am- 'bitious to be believable, I 'must tell you this is exactly 'what we did for our 1978 Sum- 'mer Meet with excellent suc- 'cess. We hope we can work it 'out again for the Summer of '1980. Keep up your great work 'with THE HORN SPEAKER. We 'need you.

' Cordially,
' Larry Babcock,
' vice president
' Niagra Frontier
' Wireless Association
' 8095 Centre Lane
' E. Amherst, NY 14051

'**********

VRPS AUCTION

The Vintage Radio and Phonograph Society held their annual "Winter" auction on March 15, 1980 with a crowd of about 60 enthusiasts.

A Crosley 51 sold for $75.00; followed by a Philmore Crystal set for $60.00, a telegraph sounder brought $9.00, a Philco 37-610 raised a price of $40.00, a slide tuner sold for $17.50, unknown horn speaker, a cutie, sold for $85.00, 24-4 minute cylinder records eased up to $45.00 and sold, 1916 Murdock aerial switch captured $20.00, an Emerson sign sold for $10.00. A lot of merchandise was present at the auction--it lasted about 3 hours or more.

John Rawlins, auction chairman, said that all went well.

GREATER NEW YORK "CLUB"

The Greater New York Vintage Wireless Association goes by GNYVWA and it is relatively new. Louis F. Lindauer is the president as well as the newsletter editor. Jack Allison is vice president and the secretary, the one to contact about questions on GNYVWA, is Ralph Thorn, who is addressed at: 61 Maple Pl., Huntington N. Y. His telephone number is (516) 281-8642. The treasurer, Charlotte Mager, was kind enough to send us information about GNYVWA.

'**********
'********COMPUTER FILES********
'**********

' THE HORN SPEAKER placed its 'mailing list on a computer for 'March 1980. We can now supply 'easily printed information for 'collectors who want to know a- 'bout other collectors in their 'area. The computer can also be 'used for who needs what. Most- 'ly, we plan to use it for his- 'torical files and word editing 'in addition to the mail list.

'**********

S. LEONARD

WANTED!

Horn phonographs music boxes crank organs, daguerreotypes, clocks, old mechanical toys, battery toys, Bought, sold, traded and serviced.

P.O. Box 127
Albertson, L.I.,
N.Y. 11507
U. S. A.
(516) 742-0979

RATES FOR THE HORN SPEAKER
One year.....$7.00
Two years.....$12.00
Special rates for one year
First class.....$12.00
Foreign air mail.$16.00

mart

Classified ad rate: 6¢ per word
Photo ads: $2.00 extra
Deadline: 20th of the preceding month.

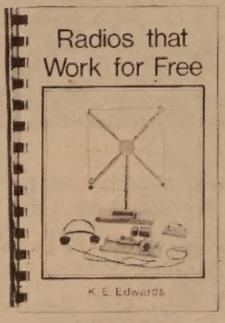
ADAMS MORGAN (PARAGON) 1922 catalog reprint. VT control, crystal, radios, transmitter etc., 16 pages illustrated $2.95 ea. plus .50 handling mailing. Cecil Bounds, Pine Springs Rte., Carlsbad NM 88220.....

REPAIRS MADE ON ANTIQUE CRANK-TYPE PHONOGRAPHS. Sound reproducers overhauled. Springs repaired. Also WANTED any parts to these phonographs.
John Nagy, Route 1, Box 135,
Walcott, Iowa 52773.
(319) 843-2108 evenings.

WANT TO repair sets that you cannot. Meticulous work always done. Hand-rubbed-varnish refinishing services available. Twenty years experience. WANT several RIDER manuals.
Maury Zivitz, Ph. D., 11503 Atwell Drive, Houston TX 77035.
(713) 723-4254, after 3.

Since 1975 "Radio Age" magazine has featured articles on the history of early radio, restoration hints, biographical sketches of radio pioneers along with lots of photographs and classified ads. "Radio Age" is published monthly except July and August. Subscriptions are $10.50 for 1st class mailing and $8.50 for 2nd class mailing. Send check or money order to Radio Age, 636 Cambridge Rd., Augusta GA 30909. Sample $1.00.

Radios that Work for Free



"Radios that Work for Free" is a "How to" book for all ages. This is the most comprehensive work of its kind. Not only does the reader get a new hobby, but the skills necessary to continue in a science and art that needs revival. The projects can be built from recycled junk on the kitchen table by the novice with assured success. Years of research and countless hours of experimentation have been accumulated to provide this base for the beginner. You will fill many hours building, listening and experimenting with "Radios that Work for Free."

ORDER FORM

HOPE and ALLEN
Publishing Company
P. O. Box 535
Belmont, California 94002

Please place my order for____copies of "Radios that Work for Free" by K. E. Edwards at $5.00 per book. (CA. add 6% tax) Please add 50¢ for postage/shipping. Check must accompany order.

Ship to: _____

ATTENTION TESLA ENTHUSIASTS!
Information on Tesla is difficult to obtain. Now there is a magazine for Tesla historians and electrical experimenters: "Tesla's Technology". Published 6 times yearly; 8½" X 11" nicely printed. Each issue contains; Feature article, reprint of old Tesla article, Tesla patent, Serial articles, notices. Subscription $10.00 yearly.
Tesla Research Society, 151 Grofftown Road, Lancaster PA 17602..

FOR SALE OR TRADE

****

TELKOM ROARING '20's DECORATOR TELEPHONE

'NEW ROARING 20'S DECORATOR
'TELEPHONE. ROTARY DIAL AND
'RINGER WITH VOLUME CONTROL.
'FCC APPROVED, MODULAR PLUG.
'COLOR: IVORY ORDER TODAY.
'$89.95 POSTPAID.
'KEITH ELECTRONICS, 209
'BELLEFONTE AVE., LOCK HAVEN,
'PA 17745..

'**********
' ## RADIOS FOR SALE **
'ZENITH 9S262 CONSOLE $50.00
'PHILCO 90L CONSOLE 40.00
'CROSLEY 51 (REPRO BOX) 45.00
'EMERSON BA199 (P 82 FOS) 20.00
'PHILCO 54 (POOR, GOOD CH)20.00
'MARWOL 5-TUBE W/TUBES 60.00
'SPARTON TV MIRROR TYPE 25.00
'KELLOGG HIBOY (USES 24'S)40.00
'KELLOCG 507 CHASSIS 25.00
'THERMIODYNE CHASSIS TF-6 45.00
'GREBE SYNCHROPHASE WITH
' TUBES 125.00
'BR-DRAKE 1927+- RED
' PANEL 60.00
'BREMER-TULLY COUNTERPHASE
'6 KIT W/TOROIDAL COILS,
'FERRANTI AUDIOS 50.00
'KENNEDY V IN CARRYING BOX
'HAS 3 BRASS 01-A'S, SET
'OF KENNEDY 'PHONES
' CLEAN 400.00
'OPERADIO CONSOLETTE
' 1926 125.00
'CROSLEY PLAYTIME CLOCK
'RADIO & CLOCK OK 250.00
'EMERSON 6" TV 50.00
'A.K. TYPE H HORN (BR.
'BRN) DRIVER CONT. 45.00

FOR SALE OR TRADE

'MICHIGAN 1-TUBE 90.00
' ** MAGAZINES **
'RADIO NEWS
'1923 - JAN FEB MAY JULY SEPT
' OCT NOV DEC.
'1924 - COMPLETE; JUNE DIRTY;
' SEPT NO COVER, 2 MAY.
'1925 - JAN FEB MAR APR MAY JUL
' SEPT DEC.
'1926 - JAN MAR APR MAY DEC.
'1927 - JAN FEB MAR JUL NOV
' (JAN NOV NO COVERS)
'1930 - MAY JUN (FADED) SEPT
' NOV DEC (3 COPIES)
'1931 - JAN (BAC COV OFF) FEB
' MAR APR JUN JULY (NO
' COVER) AUG SEPT (NC)
' OCT.
'1932 - APR (BACK COV OFF) OCT
' (2)
'1933 - JAN (DIRTY)
'1923 - 1925 $7.00 EACH; LESS
'IF YOU WANT QUANTITY.
'1926-27 $4.00 LESS IF QUANT.
'THE REST $2.00 THE WHOLE
'LOT FOR $250.00.
'RADIO CRAFT
'24 ISSUES 1930 - 1933 MOST
'FAIR, SOME POOR. THE LOT FOR
'$12.00.
'RADIO BROADCAST
'OCT. 1924 $7.00
'POPULAR RADIO
'JUL '22; JUN '23; MAR '26;
'MAY '26; SEPT '26. (LAST TWO
'DIRTY, $2.00 EA.) OTHERS $5.00.
'RADIC WORLD
'10 ISSUES 1930 - 31 $10.00
'SERVICE
'1934 ALL XC APR MAY
'1935 COMPL
'1936 JAN FEB $25.00 LOT.
'RADIO NEWS
'9 ASST 1943-44 $5.00
'RADIO
'10 ASST 1943-44 $5.00.
'QST
'1940 - 1976 LESS 1945, 1964
'MOST OF THE REST THERE $20.00
'FOR THE LOT.
' ** BOOKS **
'THOMPSON - ELEMENTARY LESSONS
' IN ELECTRICITY & MAGNET-
' ISM $1.00 1892.
'RYDER - SERVICING SUPERHETERO-
' DYNES 1931 NICE $5.00.
' SERVICING RECEIVERS BY
' MEANS OF RESISTANCE
' MEASUREMENT 1932 NICE
' $5.00.
' FREQUENCY MODULATION
' 1940 $5.00.
'DUNLAPS' RADIO MANUAL 1924
' $5.00 (LINE ILL).
'HOAG - BASIC RADIO 1942 $5.00.
'DUNLAP ELECTRICAL & RADIO DICT-
' IONARY 1945 3RD ED. $4.
'WRITE FOR PARTICULARS;
'RICHARD C. FOSTER, 12 SHAWMUT
'AVE., COCHITUATE MA 01778.
'CALLS 7 - 9 PM MY TIME ONLY
'617 655-2056.
'SHIPPING EXTRA, ON ALL ITEMS.
'**********

FOR SALE OR TRADE

'**********
'A.K. 33 IN POCLEY CABINET WITH
'E SPEAKER BUILT IN, NICE
'$90.00. WORLD RADIO'3 DIAL
'COMPLETELY RESTORED $85.00.
'A FEW OUTSIDE HORN PHONOS.,
'CYL. & DISC. EDISON, COLUMBIA,
'VICTOR, PATHE, STAR.
'D. DEXTER(151 HUDSON ST.,
'NEW YORK NY 10013.
'WORK 212 975 6231
'HOME 212 226 4885.
'**********
'HAVE MICROPHONES MADE BY TAN-
'NOY OF LONDON AND USED IN THE
'HOUSE OF COMMONS. EXCELLENTORQSG
'CONDITION DYNAMICS WITH A
'HISTORY. EACH WITH DESK STAND.
'SEND $1.00 FOR PHCTOGRAPH AND
'AND SPECIFICATIONS. A RARE
'FIND. W TURNER, PO BOX 13069,
'ARLINGTON TX 76013.
'**********
'FOR SALE; MODERN "B" COMPACT
'BATTERY ELIMINATOR MINT-WORKS
'$25.00, MAGNAVOX TRF 5 NEEDS
'TLC $45.00, TUNGAR TRICKLE
'CHARGER $9.00, "YANKEE" POCKET
'VOLT METER $8.00, THREE DIF-
'FERENT SIZES PORCELAIN KNIFE
'SWITCHES $9.00, FOUR LARGE HEM-
'INGRAY POLE INSULATORS $8.00,
'BUSTED VIBROPLEX KEY $6.00,
'WALLY'S LOW LOSS ONE TUBE RE-
'GENERATIVE RADIO $95.00, IN-
'TERNAL HORN TABLETOP VICTROLA
'MAHOGANY NICE SHAPE WORKS
'GOOD $115.00, CIROLA WOODEN
'PORTABLE PHONOGRAPH INTEREST-
'ING SOUND BOARD SETUP $75.00,
'LOOSE COUPLER AND CRYSTAL DE-
'TUCTOR NUMBER M382 $95.00.
'MAGAZINES: POPULAR RADIO OCT-
'OBER 1924 & APRIL 1925 $4.00
'EACH, RADIO NEWS JANUARY 1927
'$2.00, RADIO WORLD OCTOBER 4,
'MARCH 15, NOVEMBER 29, AND
'JULY 12 ALL 1924 $4.50 EACH,
'RADIO DIGEST JANUARY 27,
'1923 $6.00 AND FEBRUARY 6,
'1926 $3.00, WIRELESS AGE
'JANUARY 1925 $5.00.
'ANTHONY CASERTA, 47 VISTA
'LANE, LEVITTOWN NY 11756.
'PHONE 516 731-7175 NIGHTS.

'**********
'BEST OFFER TAKES THE LOT
' SOLD BY THE LOT ONLY.
' 153 TUBES TESTED
' some in boxes.
'35Z5-10, 35L6-3, 32-3, 34-3,
'950-2, 5Y3-4, 80-7, 41-3, 42-4,
'45-2, 19-2, 57-4, 6Q7-4, 6SK7-6,
'6CD6-4, 6K7-5, 6K6-2, 84-3,
'76-3, 78-2, 26 SERIES-20, 27-6,
'6SN7-20, 6U7-3, 6J5-5, 12SA7-7,
'12SK7-6, 12SQ7-10, 50L6-3,
'24A-4, 71A-3, PLUS LOTS OF
'RADIOS FOR SALE* GEORGE
'FRIEDRICH, RT. 1. BOX 85, CUST-
'ER, WI 54423 ; TEL: 715-592-
'4901.
'**********

FOR SALE OR TRADE

'**********
'DIAMOND NEEDLES FOR MOST MAKES 'OF PHONOGRAPH, $5.00 EACH POST 'PAID. SEND MAKE AND MODEL 'NUMBER OF PHONOGAPH AND OLD 'NEEDLE IF POSSIBLE. ALSO HAVE 'SWISS STEEL PHONOGRAPH NEEDLES. 'PACKAGE OF 25 FOR $1.00 POST 'PAID. KEITH ELECTRONICS, 209 'BELLEFONTE AVE., LOCK HAVEN 'PA 17745. PHONE 717 748 7163.
'**********
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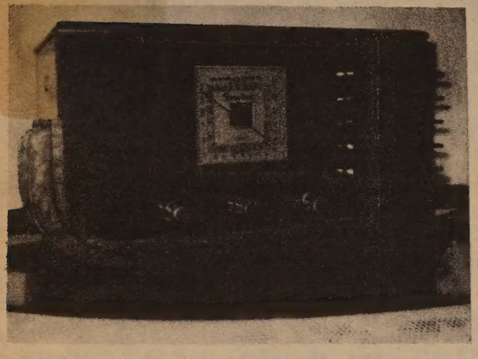

COLORED MIRRORED RADIOS (blue, peach, green) wanted by obsessed collector. I'm also interested in colored mirrored clocks. Can use any unusual items from art deco period, such as chrome radios, weird colored plastic radios etc. Also wanted: Philco predicta television sets, coin operated radios.
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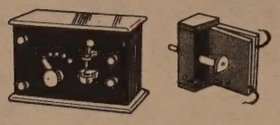
H. Layer, AV-SFSU, 1600 Holloway, San Francisco CA 94132. . . .

WANTED



HELP! Who has either of the items pictured above? Regardless of condition! (simple crystal receiver or wooden book tuner) Need badly.
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ANTIQUE RADIO TOPICS &
THE CLASSIC RADIO NEWSLETTER

LIST NO. 18A

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